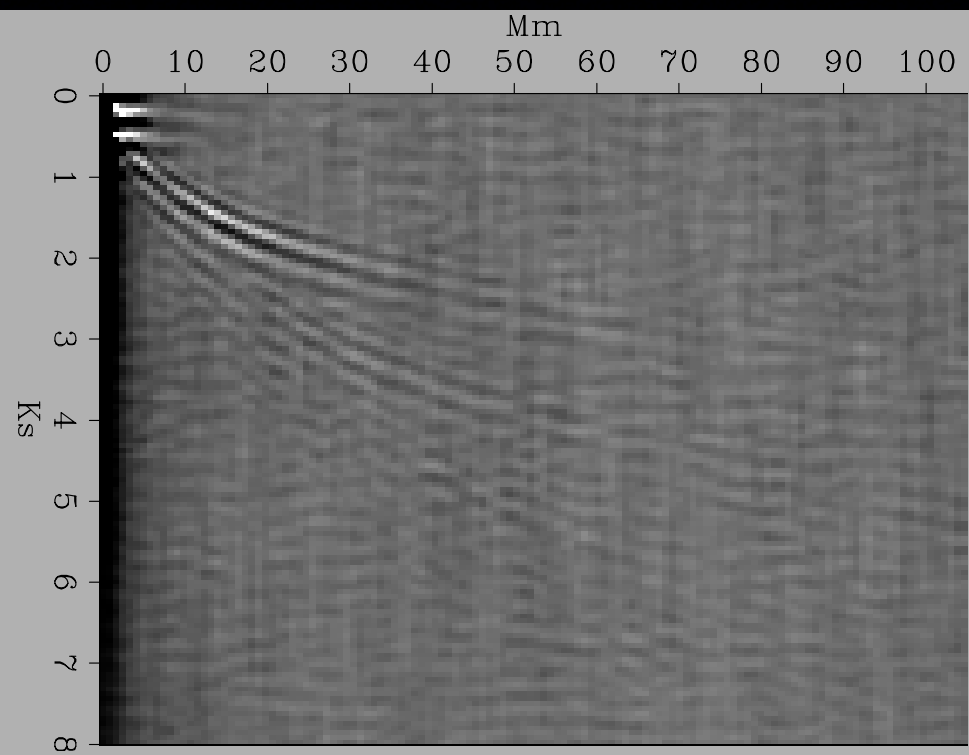
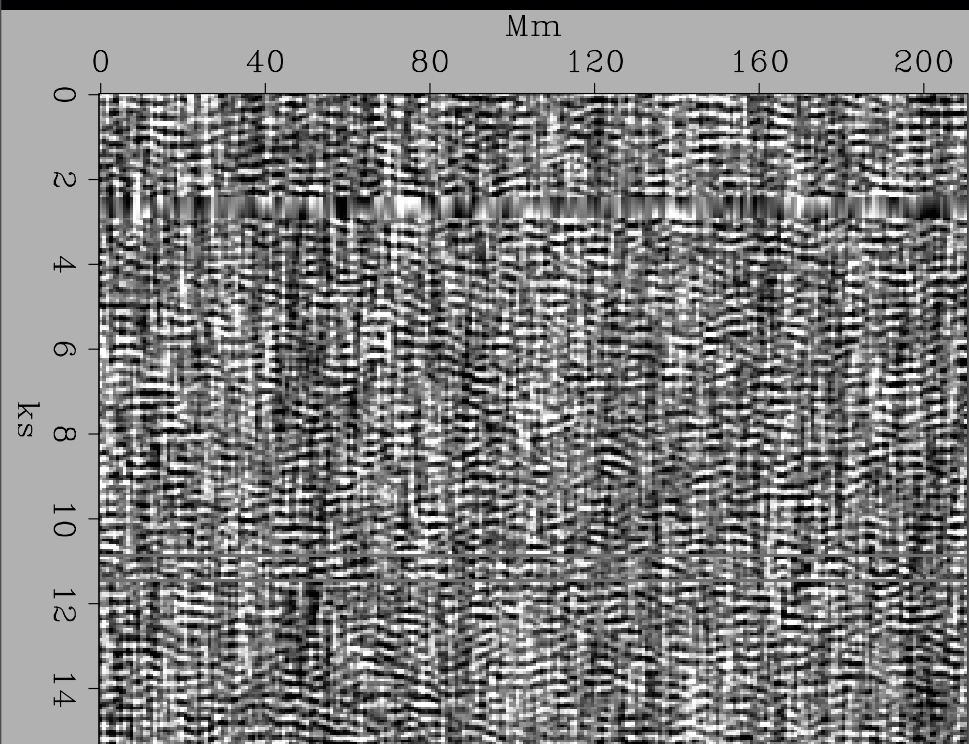


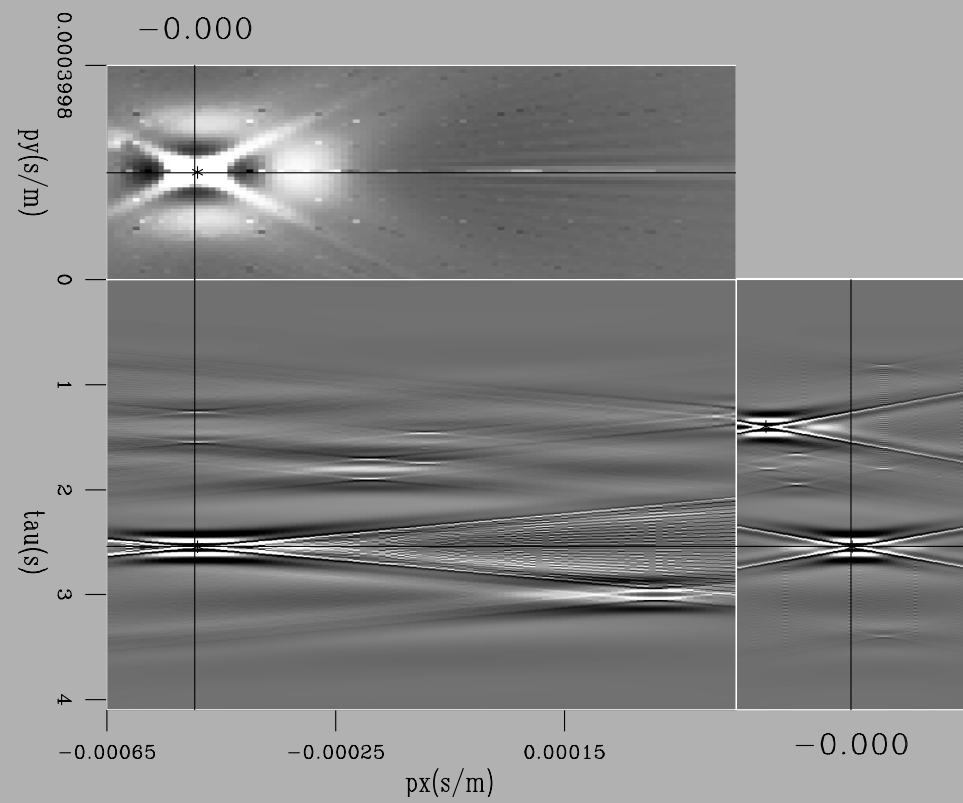
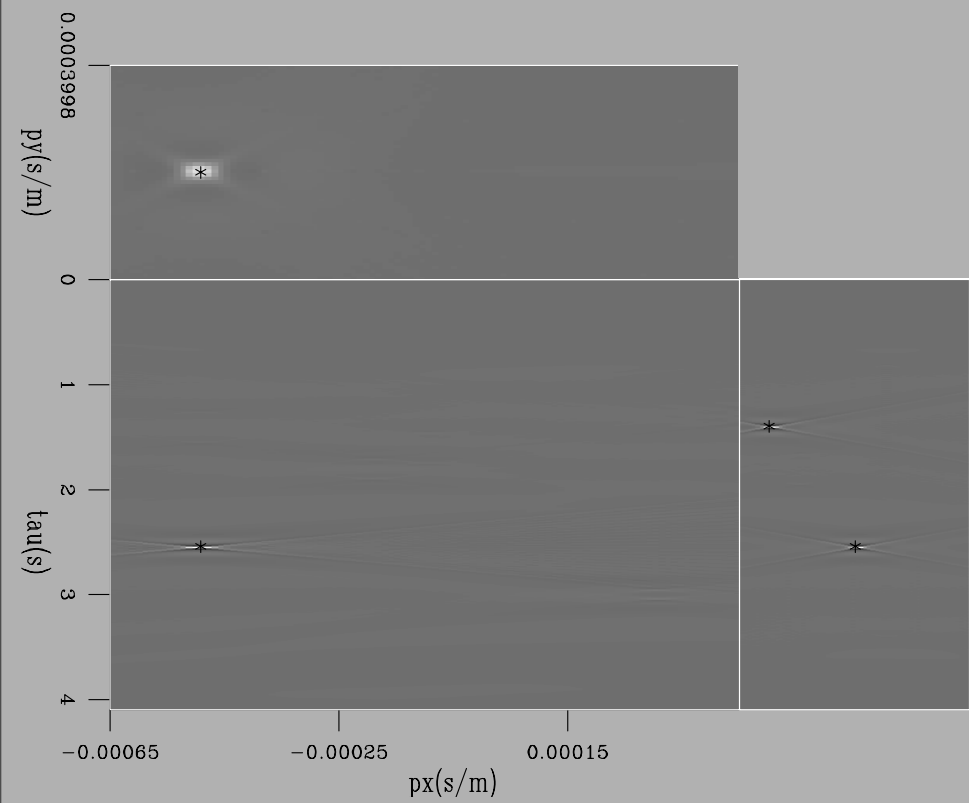
Model-space statistics in place of inversion

sep124 page 271

Brad Artman

How I failed to analyze
the source functions
within passive data





Parse a domain

- Select a sparse set of important parameters from a large domain
- Select *optimal* constituents within the domain
- Parse an incomplete inversion rather than finish

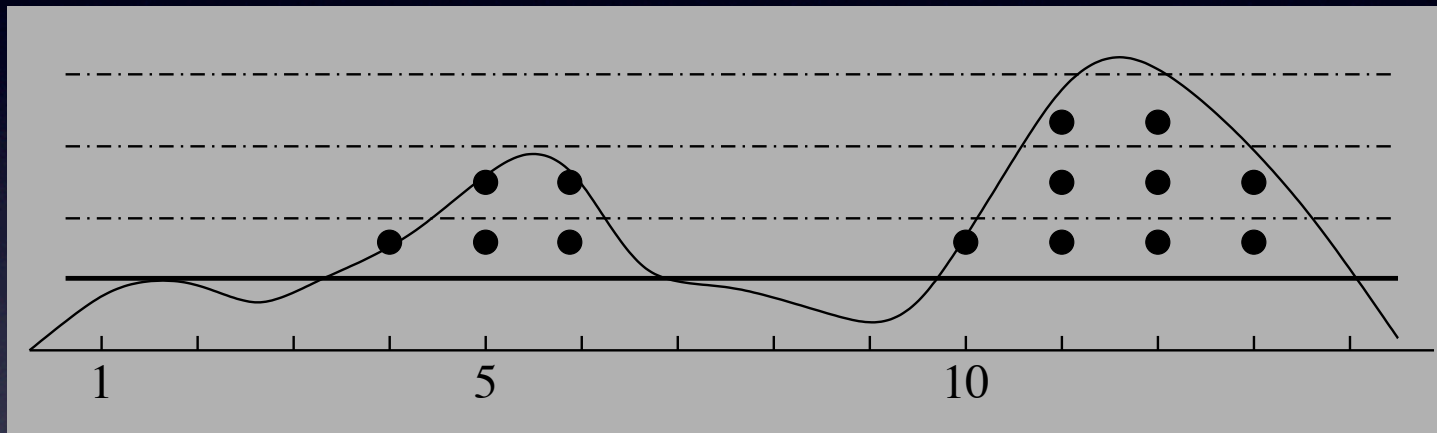
Analysis

- Sparsity of model is more important than its ability to recreate the data.
- Fancy inversion schemes are expensive.
- Model space may be large (or noisy).
- Optimal, minimal, and sparse = ??

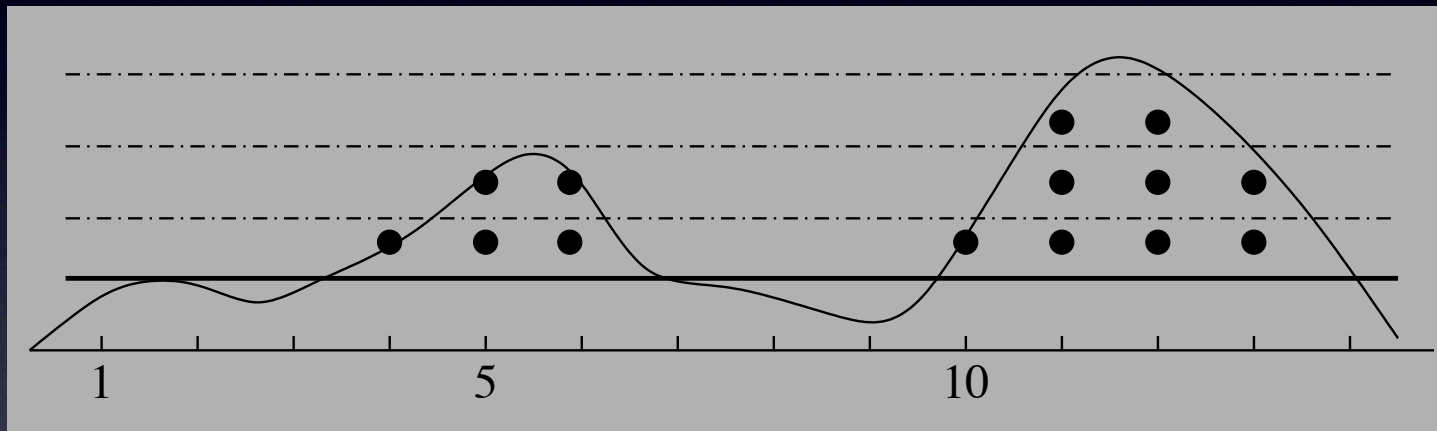
Lloyd's Algorithm

- Select a set of parameters from a domain that optimally represents the diversity of the set.
- Optimal = sparse + energetic

adaptation

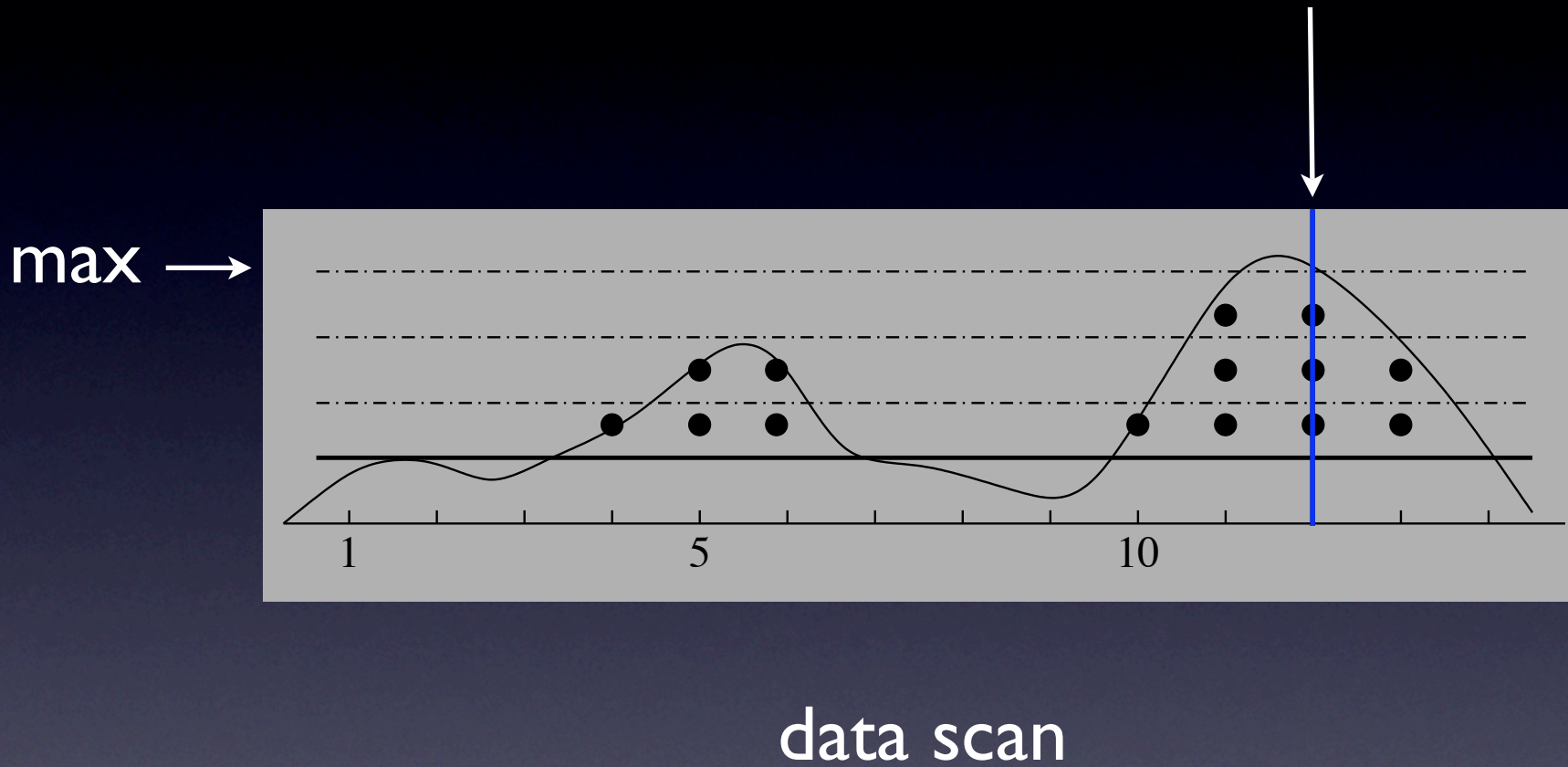


adaptation

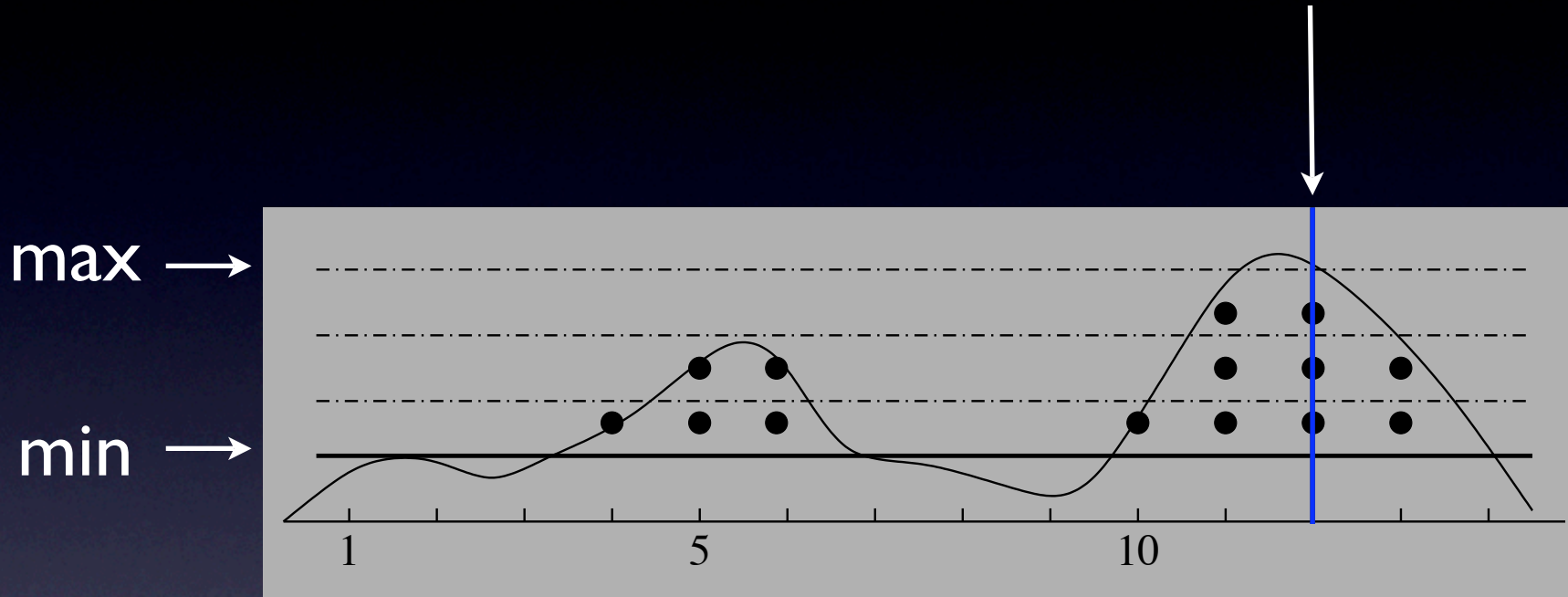


signal=amplitude at 14 samples

adaptation

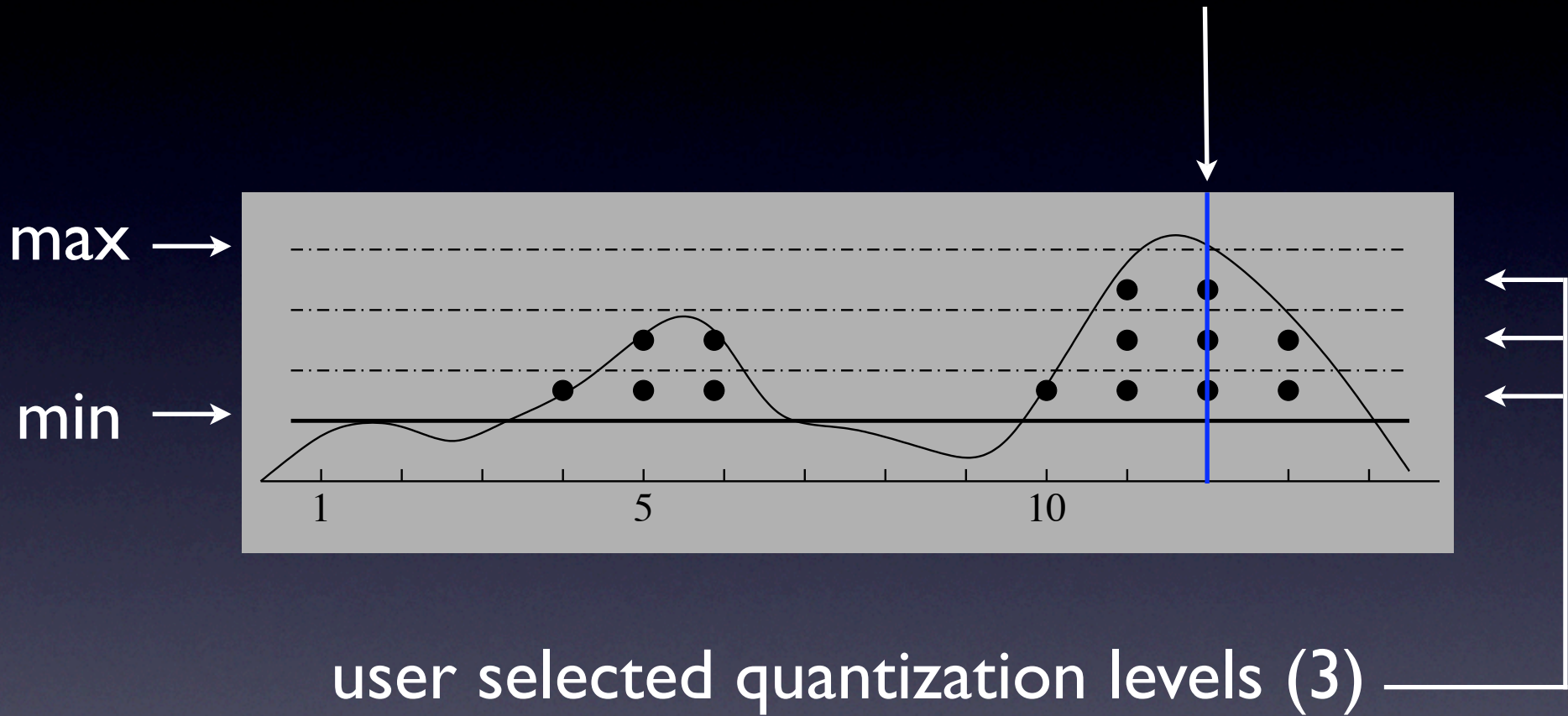


adaptation

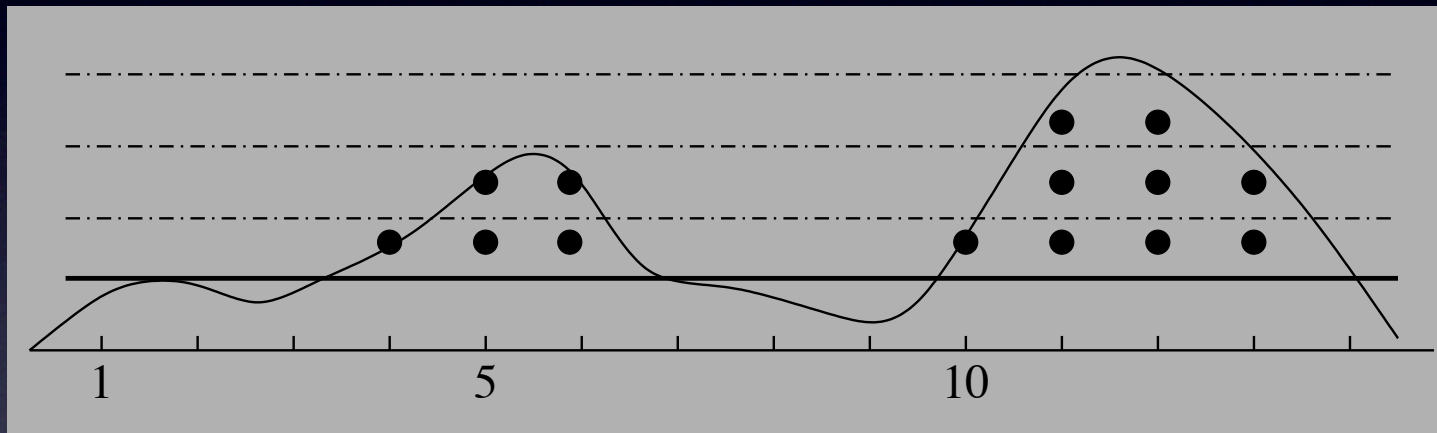


min=user defined threshold

adaptation

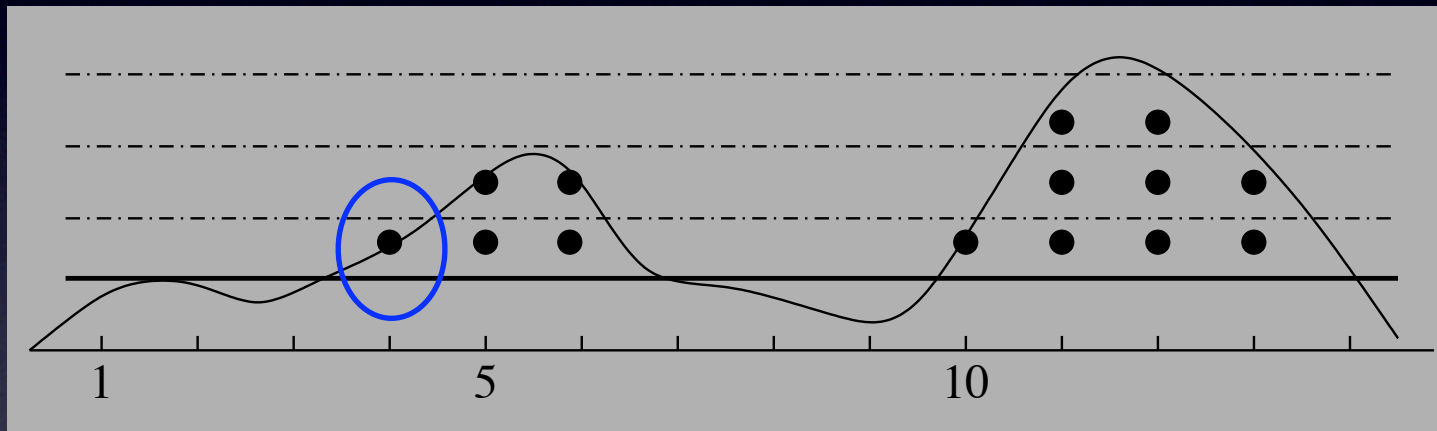


adaptation



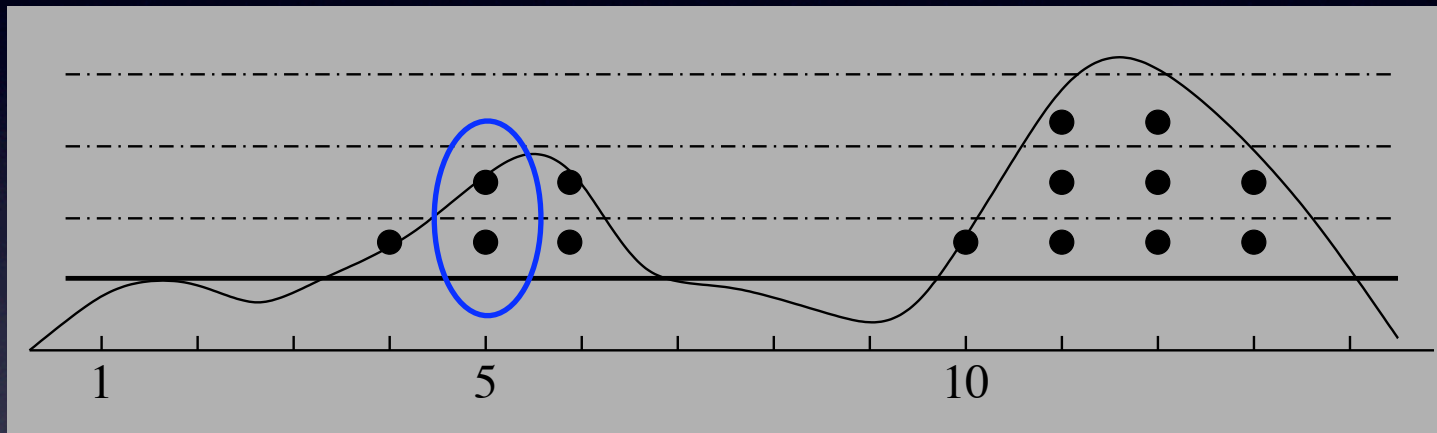
data={4, 5, 5, 6, 6, 10, 11, 11, 11, 12, 12, 12, 13, 13}

adaptation



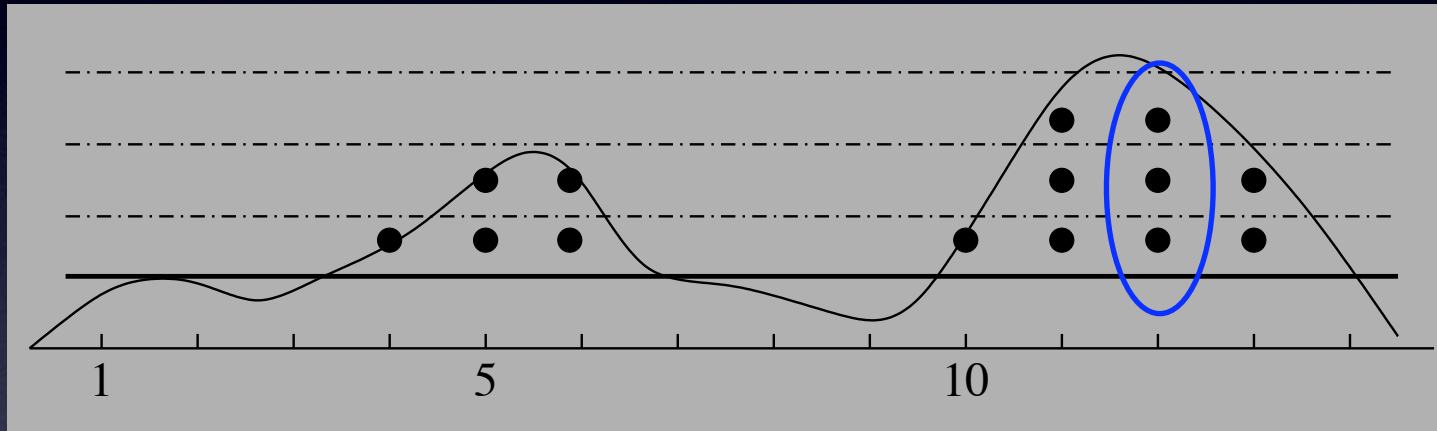
data={4, 5, 5, 6, 6, 10, 11, 11, 11, 12, 12, 12, 13, 13}

adaptation



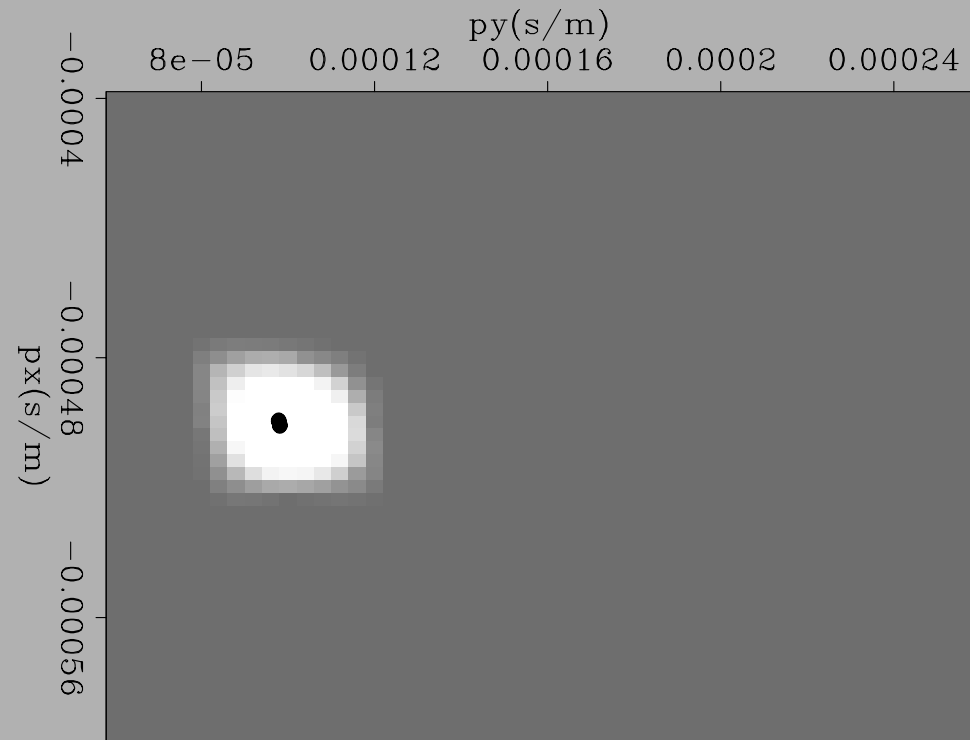
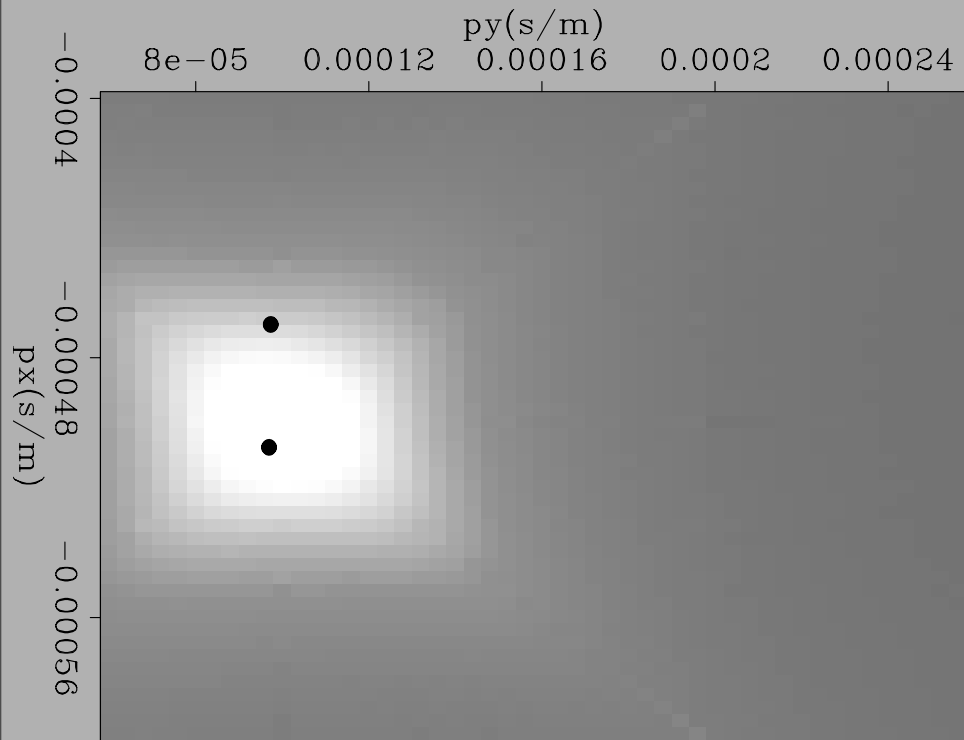
data={4, 5, 5, 6, 6, 10, 11, 11, 11, 12, 12, 12, 13, 13}

adaptation

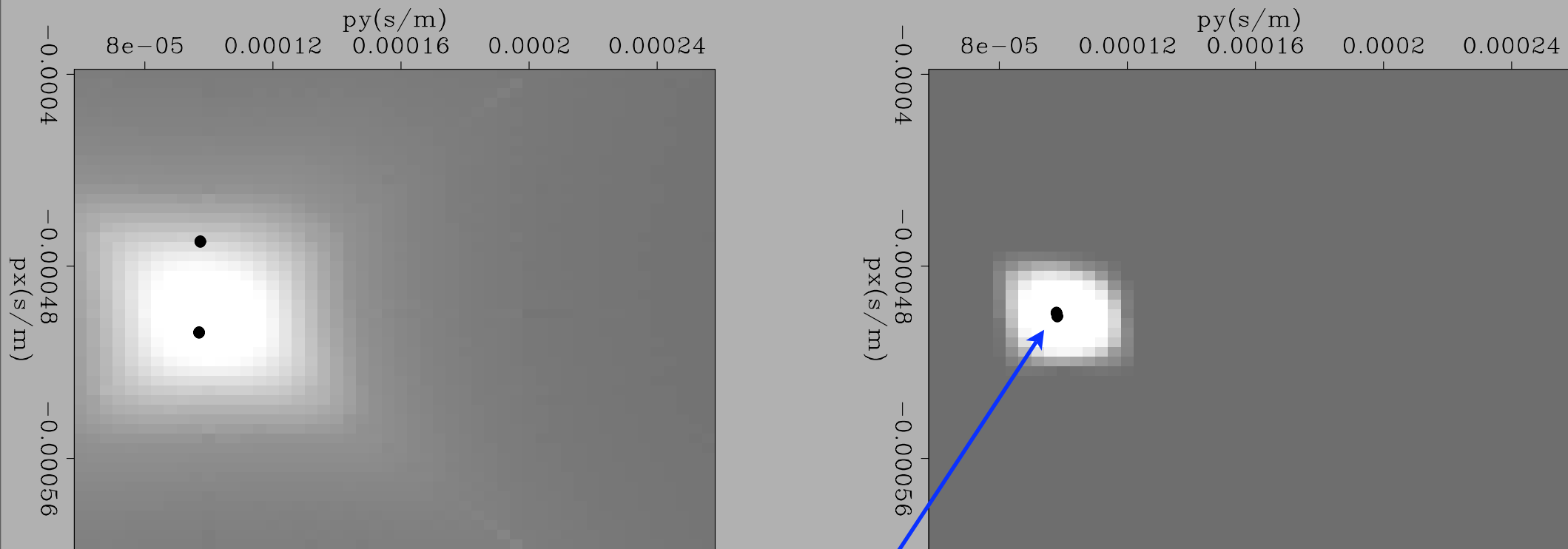


data={4, 5, 5, 6, 6, 10, 11, 11, 11, 12, 12, 12, 13, 13}

Stop the inversion!

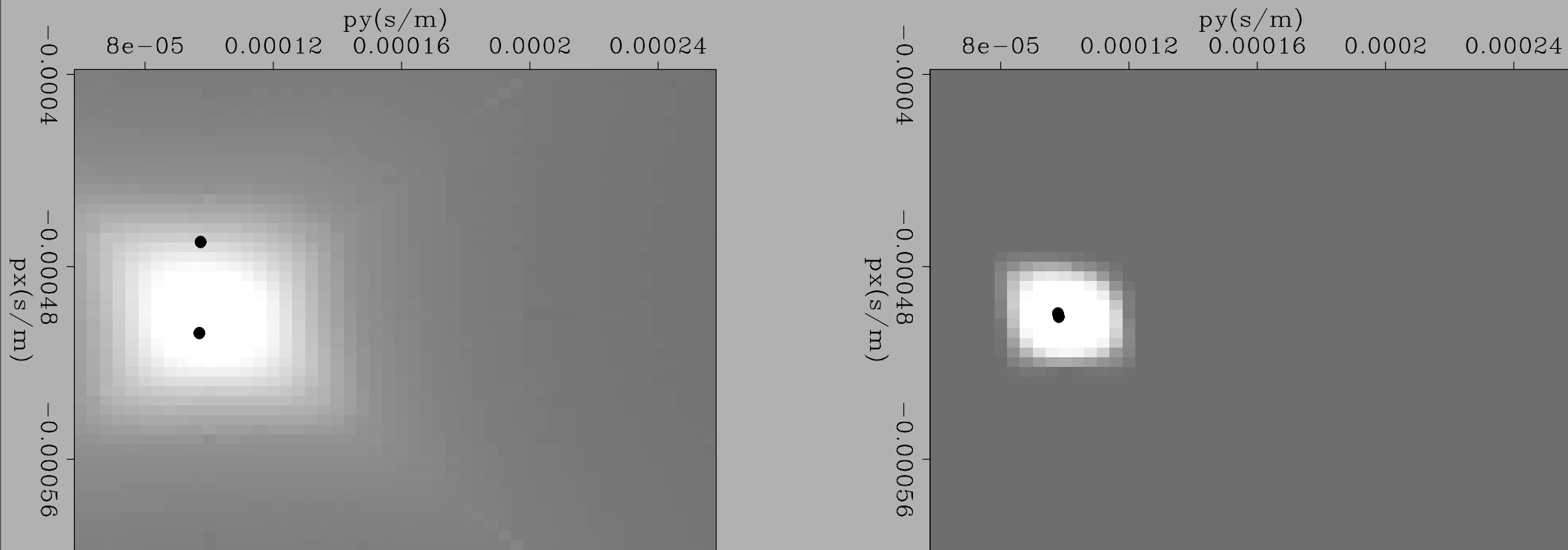


Stop the inversion!



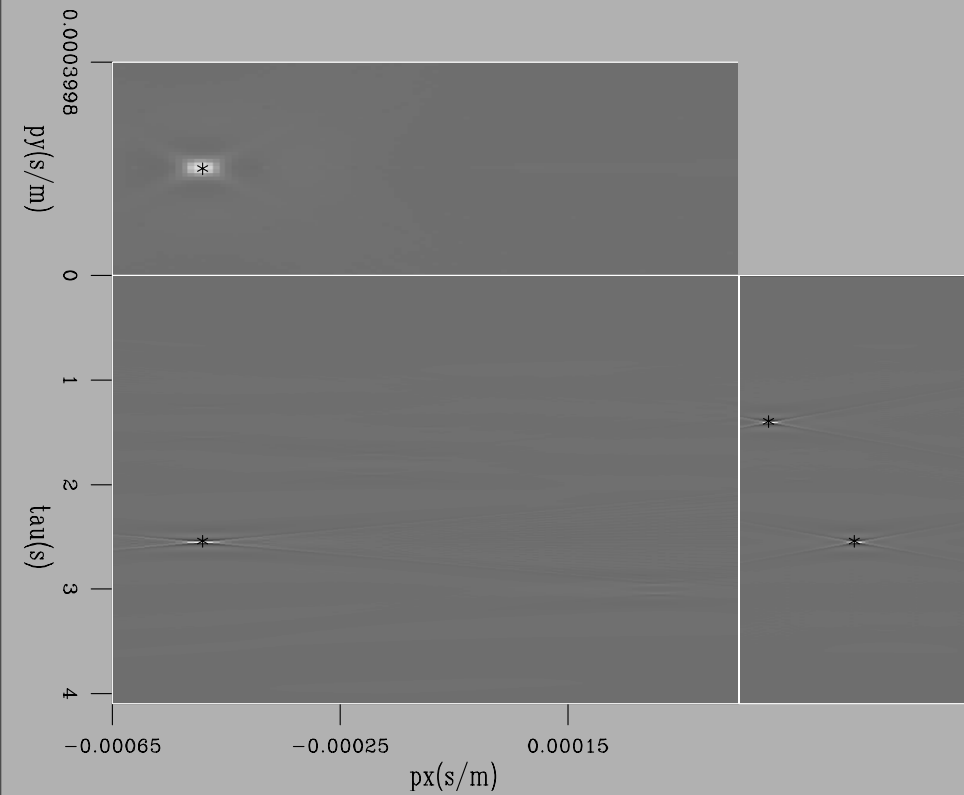
2 values

Stop the inversion!

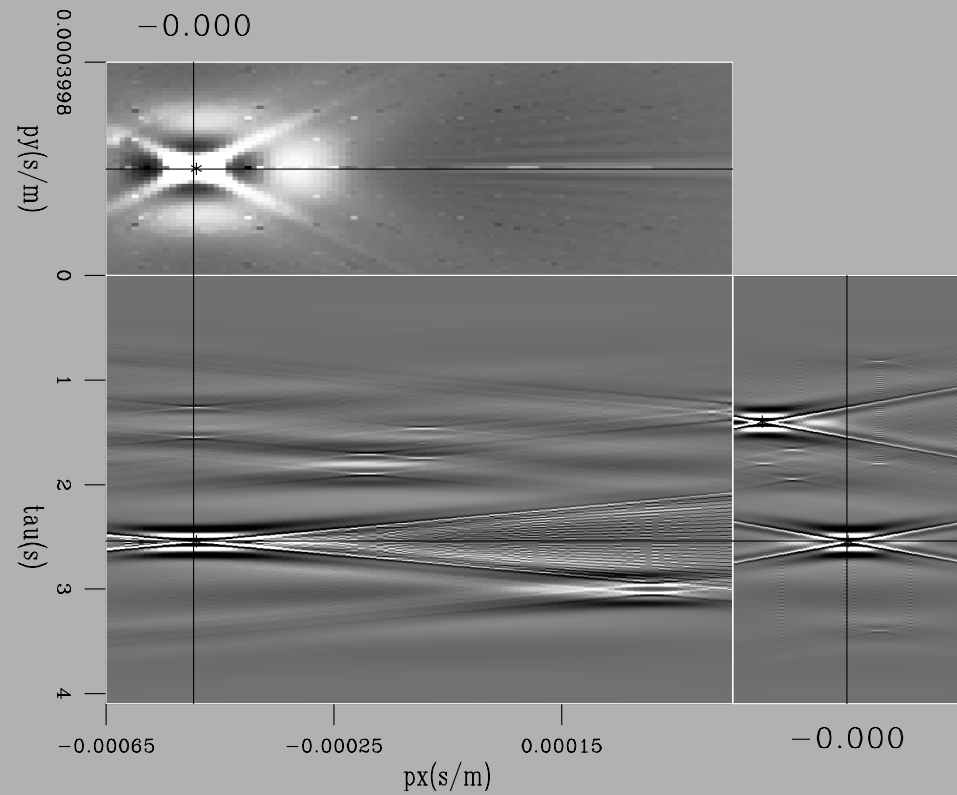


- 500 unique coordinate triples
- 3,049 coordinates selected
- 6,000,000 domain locations

6 planewaves

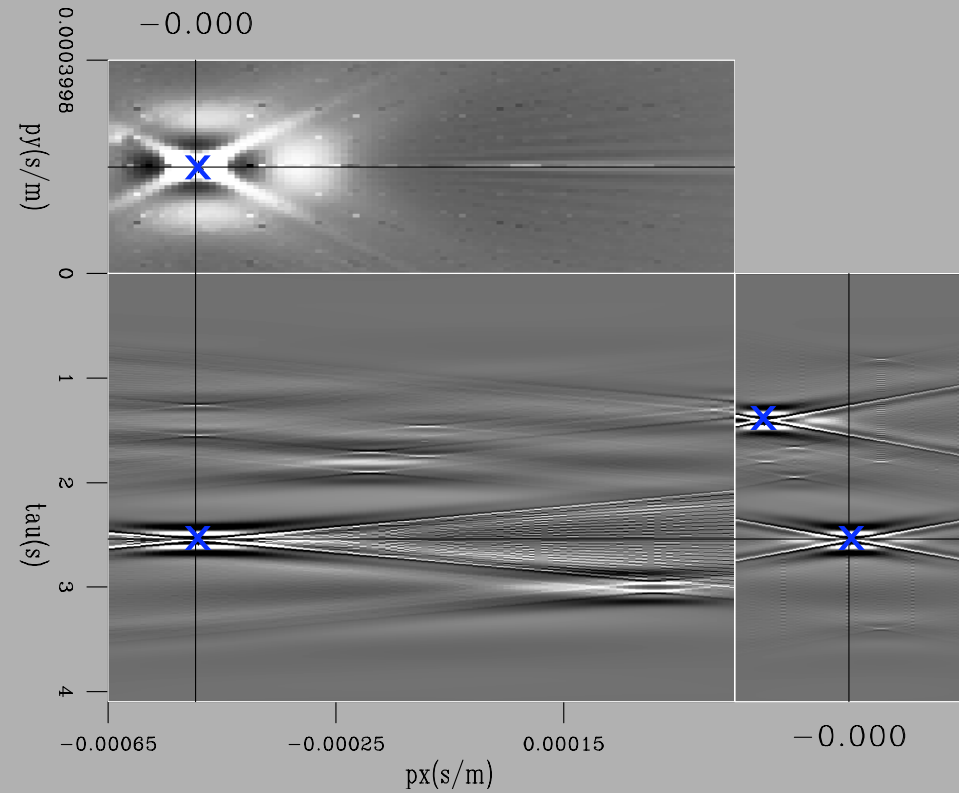
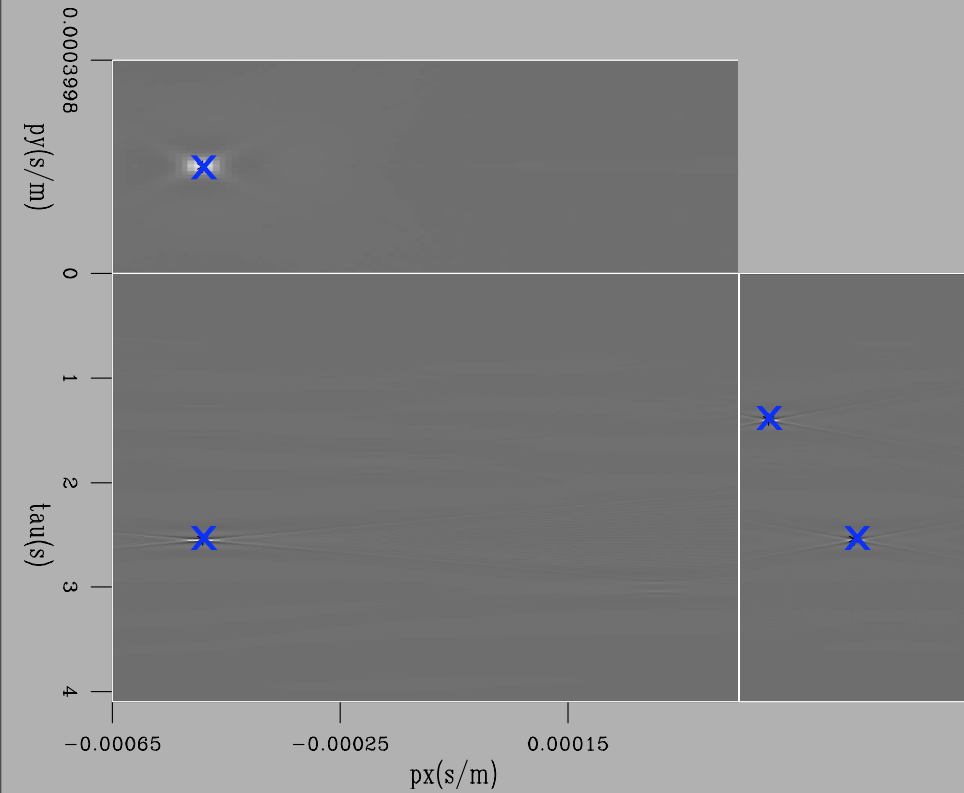


$pclip=100$

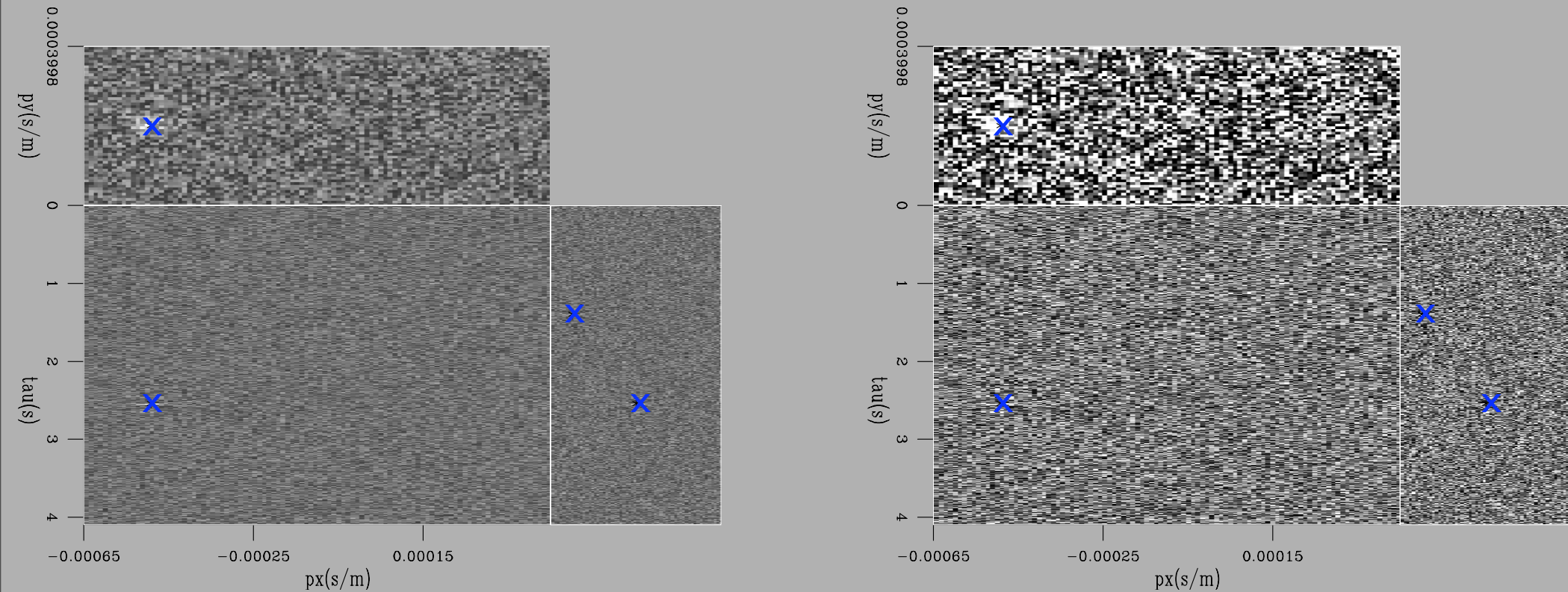


$pclip=99$

6 planewaves

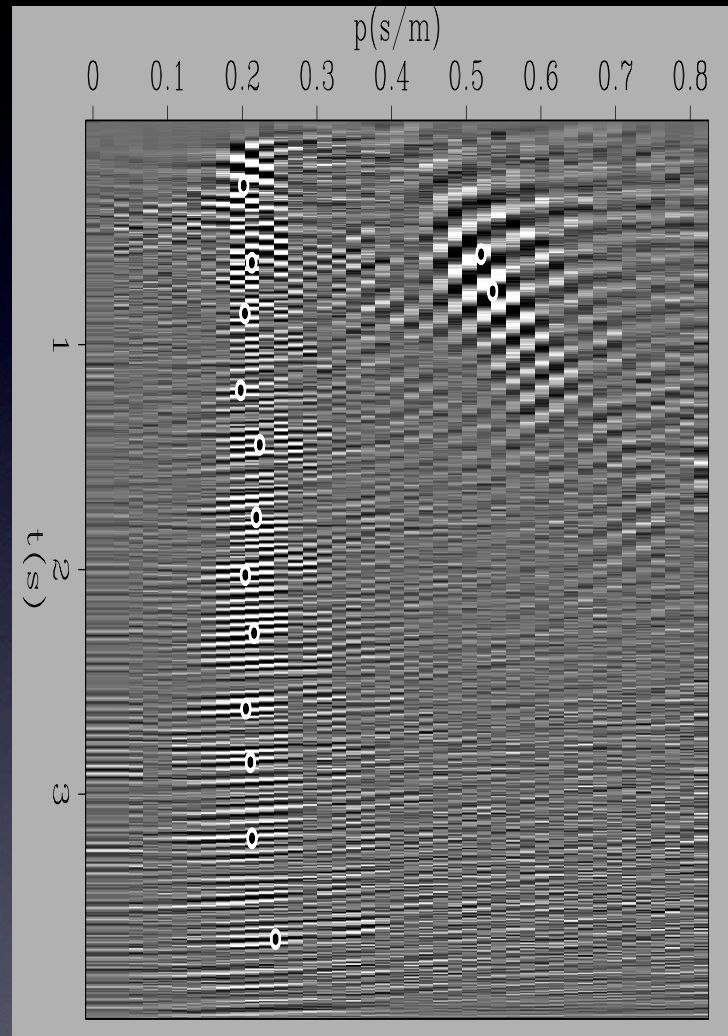


6 planewaves



variance=0.001 threshold=1%*max value

Radon transforms



- 43,000 locations
- 200 seed points
- 14 selected values
- 12 w/o high p 's

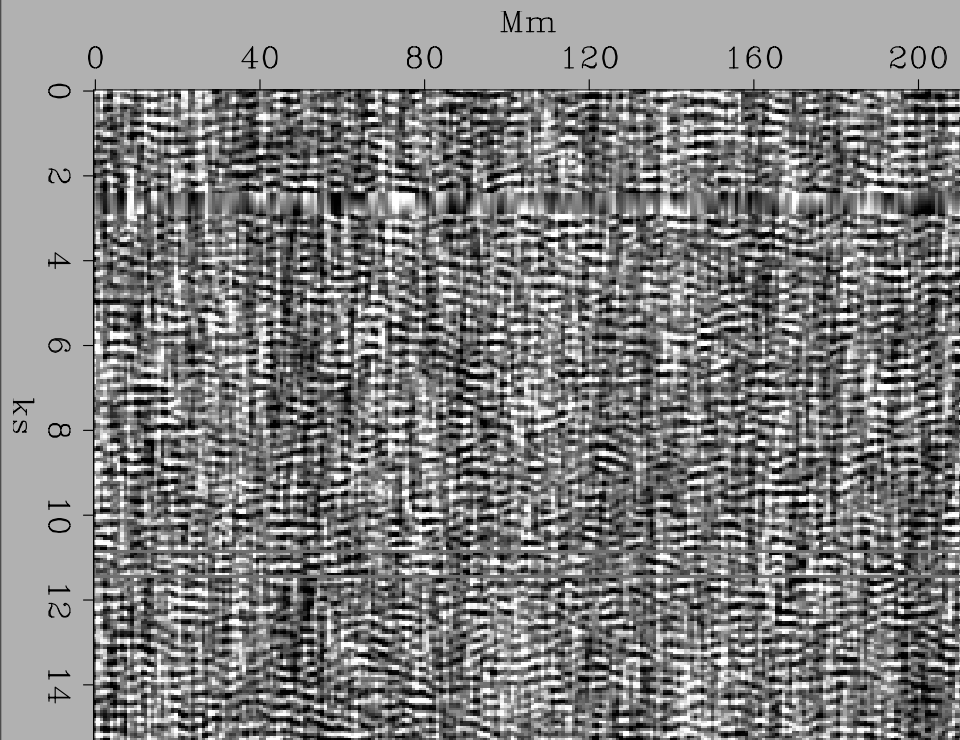
model-space analysis with Lloyd's algorithm

- Stable with high levels of noise.
- Some inversion iterations required to minimize acquisition artifacts.
- Uncorrelated axes can be concatenated along an existing axis, rather than a new one.

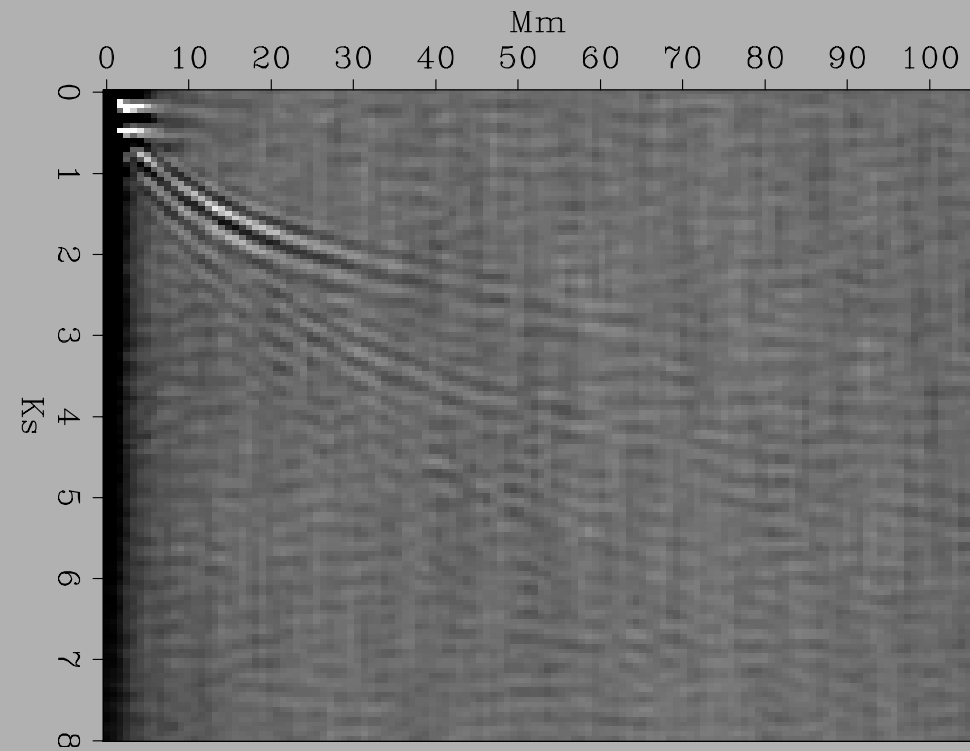
analyze source functions

- Correlation of passive data sets destroys unique information about sources.
- Planewave decomposition might help characterize sources beforehand.
- 3D model space is large and noisy- need a analysis tool: Lloyd's algorithm.

Solar passive data

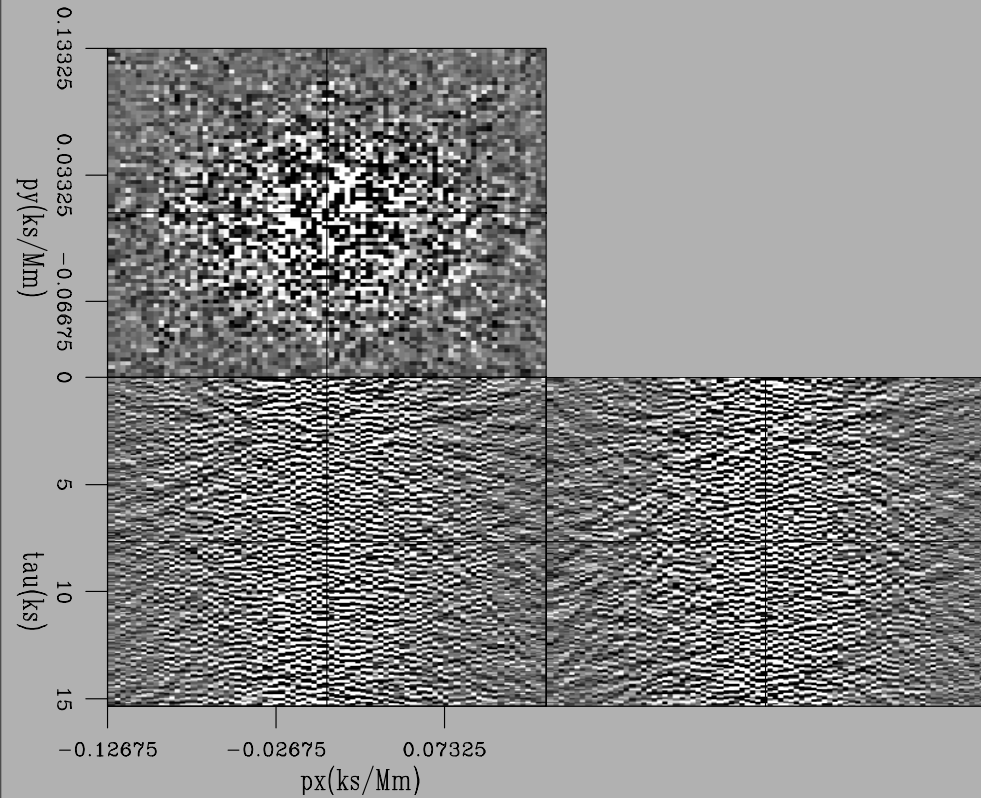


raw

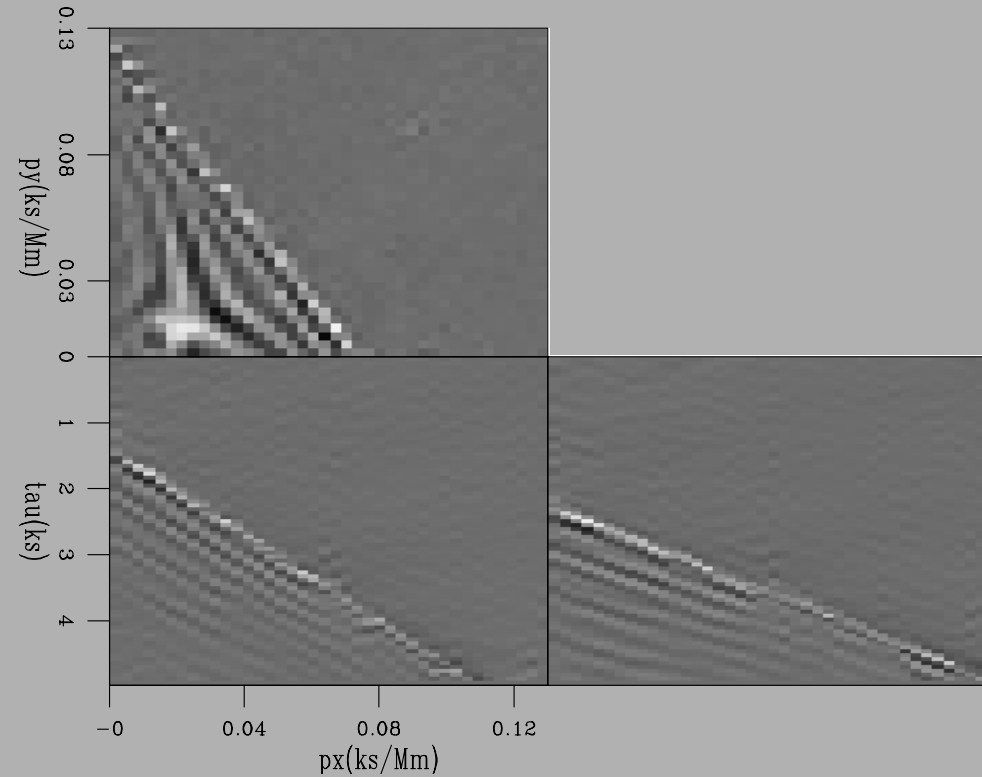


autocorrelated

Solar passive data



still noise



interpretable

